The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. In a knee prosthesis for implantation to replace a natural knee joint, the knee prosthesis having a femoral component including at least one condylar element with a condylar surface having a transverse axis of rotation, and a tibial component including at least one articular surface configured for engagement with the condylar surface of the femoral component during articulation of the knee prosthesis about the transverse axis of rotation, with the condylar surface and the articular surface engaged along corresponding posterior aspects during deep flexion, and along corresponding anterior aspects during hyperextension, the condylar surface and the articular surface being configured for enabling engagement between the condylar surface and the articular surface along a prescribed track having a predetermined curvature which enables relative rotational movement between the femoral component and the tibial component about a longitudinal axis of rotation during articulation about the transverse axis of rotation, the condylar surface and the articular surface including profile contour configurations in generally medial-lateral longitudinal planes, the condylar surface having an inner surface portion confronting the longitudinal axis of rotation, and the articular surface having an outer surface portion for engagement with the inner surface portion during articulation:

an improvement wherein at least one of the inner surface portion and the outer surface portion is flared in a direction away from a corresponding other of the inner surface portion and the outer surface portion, along the posterior aspect of a corresponding one of the condylar surface and the articular surface so as to maintain essential congruency between the profile contour configurations and thereby enable an increased area of contact and decreased stress between the condylar surface and the articular surface while militating against distraction of the knee prosthesis during articulation through deep flexion.

2. The improvement of claim 1 wherein the inner surface portion is flared outwardly, in a direction away from the outer surface portion, along the posterior aspect of the condylar surface.

3. The improvement of claim 2 wherein articulation of the knee prosthesis is enabled up to about 150° of flexion.

4. The improvement of claim 2 wherein rotation about the longitudinal axis of rotation is enabled up to about 12° to 15° of rotation, during flexion up to about 150° of flexion.

5. The improvement of claim 2 wherein the flared surface portion extends along the posterior aspect of the condylar surface from a location corresponding to about 90° of flexion to a location corresponding to about 150° of flexion.

6. The improvement of claim 5 wherein the predetermined curvature of the prescribed track is generally arcuate.

7. The improvement of claim 1 wherein a least one of the inner surface portion and the outer surface portion is flared along the anterior aspect of at least a corresponding one of the condylar surface and the articular surface so as to maintain essential congruency between the profile contour configurations and thereby enable an increased area of contact and decreased stress between the condylar surface and the articular surface while militating against distraction of the knee prosthesis during articulation through hyperextension.

8. The improvement of claim 7 wherein the outer surface portion is flared inwardly, in a direction away from the inner surface portion, along the anterior aspect of the articular surface.

9. The improvement of claim 8 wherein articulation of the knee prosthesis is enabled up to about 12° of hyperextension.

10. The improvement of claim 8 wherein rotation about the longitudinal axis of rotation is enabled up to about 3° to 6° of rotation, during hyperextension up to about 12° of hyperextension.

11. The improvement of claim 10 wherein the flared surface portion extending along the anterior aspect of the articular surface extends from a location corresponding to about 0° of flexion to a location corresponding to about 12° of hyperextension.

12. The improvement of claim 11 wherein the predetermined curvature of the prescribed track is generally arcuate.

13. The improvement of claim 1 wherein the profile contour configuration of the inner surface portion includes a concave contour along the posterior aspect of the condylar surface and the profile contour configuration of the outer surface portion includes a convex contour along the posterior aspect of the articular surface for engaging the concave contour during articulation of the knee prosthesis through deep flexion.

14. The improvement of claim 13 wherein the profile contour configuration of the inner surface portion includes a concave contour along the anterior aspect of the condylar surface and the

profile contour configuration of the outer surface portion includes a convex contour along the anterior aspect of the articular surface for engaging the concave contour during articulation of the knee prosthesis through hyperextension.

15. The improvement of claim 1 wherein the condylar surface follows prescribed radii of curvature about the transverse axis of rotation, a prescribed radius of curvature of posterior portions of the condylar surface engaged by the articular surface during articulation of the knee prosthesis beyond about 110° of flexion being smaller than a prescribed radius of curvature of portions of the condylar surface engaged by the articular surface during articulation up to about 110° of flexion.

16. The improvement of claim 15 wherein a prescribed radius of curvature of portions of the condylar surface engaged by the articular surface during articulation of the knee prosthesis between about 10° and 110° of flexion is smaller than a prescribed radius of curvature of portions of the condylar surface engaged by the articular surface during articulation up to about 10° of flexion.

17. In a knee prosthesis for implantation to replace a natural knee joint, the knee prosthesis having a femoral component including at least one condylar element with a condylar surface having a transverse axis of rotation, and a tibial component including at least one articular surface configured for engagement with the condylar surface of the femoral component during articulation of the knee prosthesis about the transverse axis of rotation, with the condylar surface and the articular surface engaged along corresponding posterior aspects during flexion, and along corresponding anterior aspects during hyperextension, the condylar surface and the articular surface being configured for enabling engagement between the condylar surface and the articular surface along a prescribed track having a predetermined curvature which enables relative rotational

movement between the femoral component and the tibial component about a longitudinal axis of rotation during articulation about the transverse axis of rotation, the condylar surface and the articular surface including profile contour configurations in generally medial-lateral longitudinal planes, the condylar surface having an inner surface portion confronting the longitudinal axis of rotation, and the articular surface having an outer surface portion for engagement with the inner surface portion during articulation:

an improvement wherein at least one of the inner surface portion and the outer surface portion is flared in a direction away from a corresponding other of the inner surface portion and the outer surface portion, along the anterior aspect of at least a corresponding one of the condylar surface and the articular surface so as to maintain essential congruency between the profile contour configurations and thereby enable an increased area of contact and decreased stress between the condylar surface and the articular surface while militating against distraction of the knee prosthesis during articulation through hyperextension.

18. The improvement of claim 17 wherein the outer surface portion is flared inwardly, in a direction away from the inner surface portion, along the anterior aspect of the articular surface.

19. The improvement of claim 18 wherein articulation of the knee prosthesis is enabled up to about 12° of hyperextension.

20. The improvement of claim 18 wherein rotation about the longitudinal axis of rotation is enabled up to about 3° to 6° of rotation, during hyperextension up to about 12° of hyperextension.

21. The improvement of claim 20 wherein the flared surface portion extending along the anterior aspect of the articular surface extends from a location corresponding to about 0° of flexion to a location corresponding to about 12°. of hyperextension.

22. The improvement of claim 21 wherein the predetermined curvature of the prescribed track is generally arcuate.

23. In a knee prosthesis for implantation to replace a natural knee joint, the knee prosthesis having a femoral component including a lateral condylar element and a medial condylar element, each condylar element including a condylar surface having a transverse axis of rotation, and a tibial component including a lateral articular surface and a medial articular surface, each articular surface being configured for engagement with a corresponding condylar surface of the femoral component during articulation of the knee prosthesis about the transverse axis of rotation, with the condylar surfaces and the articular surfaces engaged along corresponding posterior aspects during deep flexion, and along corresponding anterior aspects during hyperextension, each condylar surface and each articular surface being configured for enabling engagement between the condylar surfaces and corresponding articular surfaces along respective prescribed tracks each having a predetermined curvature which enable relative rotational movement between the femoral component and the tibial component about a longitudinal axis of rotation during articulation about the transverse axis of rotation, the condylar surfaces and the articular surfaces including profile contour configurations in generally medial-lateral longitudinal planes, the condylar surfaces each having an inner surface portion confronting the longitudinal axis of rotation and the articular surfaces each having an outer surface portion for engagement with a corresponding inner surface portion during articulation:

an improvement wherein at least one of the inner surface portions and the outer surface portions is flared in a direction away from a corresponding other of the inner surface portions and the outer surface portions, along the posterior aspect of at least a corresponding one of the condylar surfaces and articular surfaces so as to maintain essential congruency between the profile contour configurations and thereby enable an increased area of contact and decreased stress between the condylar surfaces and the articular surfaces while militating against distraction of the knee prosthesis during articulation through deep flexion.

24. The improvement of claim 23 wherein each inner surface portion is flared outwardly, in a direction away from a corresponding outer surface portion, along the posterior aspect of the condylar surface.

25. The improvement of claim 24 wherein articulation of the knee prosthesis is enabled up to about 150° of flexion.

26. The improvement of claim 24 wherein rotation about the longitudinal axis of rotation is enabled up to about 12° to 15° of rotation, during flexure up to about 150° of flexion.

27. The improvement of claim 24 wherein the flared surface portions extend along the posterior aspects of the condylar surfaces from locations corresponding to about 90° of flexion to locations corresponding to about 150° of flexion.

28. The improvement of claim 27 wherein the predetermined curvature of each prescribed track is generally arcuate.

29. The improvement of claim 23 wherein at least one of the inner surface portions and the outer surface portions is flared in a direction away from the other of the inner surface portions and the outer surface portions along the anterior aspect of at least a corresponding one of the corresponding condylar surfaces and the articular surfaces so as to maintain essential congruency between the profile contour configurations and thereby enable an increased area of contact and decreased stress between the condylar surfaces and the articular surfaces while militating against distraction of the knee prosthesis during articulation through hyperextension.

30. The improvement of claim 29 wherein each outer surface portion is flared inwardly, in a direction away from a corresponding inner surface portion, along anterior aspects of the articular surfaces.

31. The improvement of claim 30 wherein articulation of the knee prosthesis is enabled up to about 12° of hyperextension.

32. The improvement of claim 30 wherein rotation about the longitudinal axis of rotation is enabled up to about 3° to 6° of rotation, during hyperextension up to about 12° of hyperextension.

33. The improvement of claim 30 wherein the flared surface portions extending along the anterior aspects of the articular surfaces extend from locations corresponding to about 0° of flexion to locations corresponding to about 12° of hyperextension.

34. The improvement of claim 33 wherein the predetermined curvature of each prescribed track is generally arcuate.

35. The improvement of claim 23 wherein the profile contour configuration of each inner surface portion includes a concave contour along the posterior aspect of the corresponding condylar surface and the profile contour configuration of each outer surface portion includes a convex contour along the posterior aspect of the corresponding articular surface for engaging a respective concave contour during articulation of the knee prosthesis through deep flexion.

36. The improvement of claim 35 wherein the profile contour configuration of each inner surface portion includes a concave contour along the anterior aspect of the corresponding condylar surface and the profile contour configuration of each outer surface portion includes a convex contour along the anterior aspect of the corresponding articular surface for engaging a respective concave contour during articulation of the knee prosthesis through hyperextension.

37. The improvement of claim 23 wherein each condylar surface follows prescribed radii of curvature about the transverse axis of rotation, a prescribed radius of curvature of posterior portions of each condylar surface engaged by a corresponding articular surface during articulation of the knee prosthesis beyond about 110° of flexion being smaller than a prescribed radius of curvature of portions of each condylar surface engaged by a corresponding articular surface during articulation up to about 110° of flexion.

38. The improvement of claim 37 wherein a prescribed radius of curvature of portions of each condylar surface engaged by a corresponding articular surface during articulation of the knee

prosthesis between about 10° and 110° of flexion is smaller than a prescribed radius of curvature of portions of each condylar surface engaged by a corresponding articular surface during articulation up to about 10° of flexion.

39. In a knee prosthesis for implantation to replace a natural knee joint, the knee prosthesis having a femoral component including a lateral condylar element and a medial condylar element, each condylar element including a condylar surface having a transverse axis of rotation, and a tibial component including a lateral articular surface and a medial articular surface, each articular surface being configured for engagement with a corresponding condylar surface of the femoral component during articulation of the knee prosthesis about the transverse axis of rotation, with the condylar surfaces and the articular surfaces engaged along corresponding posterior aspects during flexion, and along corresponding anterior aspects during hyperextension, each condylar surface and each articular surface being configured for enabling engagement between the condylar surfaces and corresponding articular surfaces along respective prescribed tracks each having a predetermined curvature which enables relative rotational movement between the femoral component and the tibial component about a longitudinal axis of rotation during articulation about the transverse axis of rotation, the condylar surfaces and the articular surfaces including profile contour configurations in generally medial-lateral longitudinal planes, the condylar surfaces each having an inner surface portion confronting the longitudinal axis of rotation and the articular surfaces each having an outer surface portion for engagement with a corresponding inner surface portion during articulation:

an improvement wherein at least one of the inner surface portions and the outer surface portions is flared, in a direction away from a corresponding other of the inner surface portions and the outer surface portions, along the anterior aspect of at least a corresponding one of the condylar surfaces and articular surfaces so as to maintain essential congruency between the profile contour

configurations and thereby enable an increased area of contact and decreased stress between the condylar surfaces and the articular surfaces while militating against distraction of the knee prosthesis during articulation through hyperextension.

40. The improvement of claim 39 wherein each outer surface portion is flared inwardly, in a direction away from a corresponding inner surface portion along the anterior aspects of the articular surfaces.

41. The improvement of claim 40 wherein articulation of the knee prosthesis is enabled up to about 12° of hyperextension.

42. The improvement of claim 40 wherein rotation about the longitudinal axis of rotation is enabled up to about 3° to 6° of rotation, during hyperextension up to about 12° of hyperextension.

43. The improvement of claim 42 wherein each flared surface portion extending along the anterior aspect of the articular surfaces extends from a location corresponding to about 0° of flexion to a location corresponding to about 12° of hyperextension.

44. The improvement of claim 43 wherein the predetermined curvature of each prescribed track is generally arcuate.